

REMARKS

In the Office Action mailed January 18, 2006, the Examiner noted that claims 1-24 were pending, allowed claim 24, and rejected claims 1-23. Claims 1, 10-12, 14, 15 and 19 have been amended, and, thus, in view of the foregoing, claims 1-24 remain pending for reconsideration which is requested. No new matter has been added. The Examiner's rejections and objections are traversed below.

On page 2 of the Office Action, the Examiner objected to claim 19 and claim 19 has been amended in consideration of the Examiners comments. Withdrawal of the objection is requested.

Page 2 of the Office Action also rejects claims 1-12 and 14-17 under 35 U.S.C. § 103 over Krishnamurthy and Pharr.

Krishnamurthy discusses a system for converting a polygonal mesh surface into a B-spline curve fitted surface (see col. 15, line 65-col. 16, line 13). In doing so, the system creates an intermediate spring mesh, which is a resampling of the polygonal mesh. In doing this resampling and conversion, it is the goal of Krishnamurthy to not lose any detail, to make the resampling as faithful as possible to the original polygonal mesh and to not waste any resampled points. That is, Krishnamurthy does not resample at a higher rate than the original rate and does not add any detail to the surface.

In contrast, it is the specific intent of the present invention (see claim 1) to subsample at a "higher" rate than an original sample rate so that the additional samples can "add detail to the surface when displaced by a displacement map" resulting in "increasing" the resolution of the surface of the model. (See claims 10-12, 14 and 15 where the addition of points for added detail is also emphasized.)

Krishnamurthy does not teach or suggest such.

Pharr is about moving geometry in and out of cache so that geometry that is most recently used is kept in the cache for faster processing. When Pharr discusses discarding geometry from the cache Pharr is not talking about discarding the geometry completely but rather merely moving it out of the cache into main or secondary memory. Pharr adds nothing to Krishnamurthy with respect to the features of the invention discussed above.

It is submitted that the invention of claims 1, 10-12, 14 and 15 distinguishes over the prior art for the above-discussed reasons and withdrawal of the rejection is requested.

In addition, the processes of Krishnamurthy are very different from those of the present invention. In Krishnamurthy, the input is a surface and a displacement map is the result of processing. As emphasized in the claims in the present invention, the input includes not only a surface but also a displacement where the processed result is a higher density of geometry that captures the details that a displacement map provides. Pharr adds nothing to Krishnamurthy with respect to this additional distinction.

It is submitted that the invention of claims 1, 10-12, 14 and 15 distinguishes over the prior art and withdrawal of the rejection is requested.

The dependent claims depend from the above-discussed independent claims 1 and 15 and are patentable over the prior art for the reasons discussed above. The dependent claims also recite additional features not taught or suggested by the prior art. For example, claim 3 calls for moving points "toward a feature of the displacement map." The Examiner points to specific portions of Krishnamurthy for this alleged feature. At these portions Krishnamurthy states:

In the relaxation step, we move the spring points (at a given resolution of the spring mesh) to new locations on the polygonal patch such that the resulting spring mesh satisfies our parameterization rules.
(See Krishnamurthy, col. 21, lines 34-37)
These figures show a case where relaxation alone fails to move a spring mesh point in the desired direction.
(See Krishnamurthy, col. 23, lines 26-27)

This text does not teach or suggest moving a point toward a feature point. The remaining dependent claims 2, 4-9, 15 and 16 also emphasize features not taught or suggested by the prior art. It is submitted that the dependent claims are independently patentable over the prior art.

It is submitted that the invention of claims 1-12 and 14-17 distinguishes over the prior art and withdrawal of the rejection is requested.

Page 6 of the Office Action rejects claims 13 and 19-23 under 35 U.S.C. § 103 over Musgrave and Krishnamurthy.

Musgrave is about using grid tracing (efficiently traversing a grid) so that ray tracing can be used to render an image, the final result.

As a result, with respect to claim 13, Musgrave says nothing about calculating "approximate degrees and directions of local curvature". There is no need to make such

calculations when the object is to traverse all of the grid points to be rendered and then ray trace at the grid points to obtain the image value for the point to be rendered.

Krishnamurthy adds nothing to Musgrave with respect to the above-discussed feature.

Likewise with respect to claims 19 and 23, Musgrave says nothing about obtaining feature metrics "by approximating second derivatives of the points using height values of neighboring points in the distribution". Ray tracing at traversed grid points to render an image has no need for determining second derivatives in order to render an image.

Krishnamurthy also adds nothing to Musgrave with respect to this above-discussed feature.

It is submitted that the invention of claims 13, 19 and 23 distinguishes over the prior art for the above-discussed reasons and withdrawal of the rejection is requested.

The dependent claims depend from the above-discussed independent claim 19 and are patentable over the prior art for the reasons discussed above. The dependent claims also recite additional features not taught or suggested by the prior art. For example, claim 20 calls for "adding to the distribution sample points near extrema and features of the height field." The Examiner points to the discussion of Krishnamurthy to allegedly teach this feature. As previously discussed Krishnamurthy does not teach or suggest adding points to increase detail much less doing so near feature points or extrema. The remaining dependent claims 21 and 22 also emphasize features not taught or suggested by the prior art. It is submitted that the dependent claims are independently patentable over the prior art.

Page 7 of the Office Action rejects claim 18 under 35 U.S.C. § 103 over Krishnamurthy.

Claim 18 calls for:

identifying borders of features in the range of the displacement map; and
making a displaced surface mesh by using the borders to constrain a
triangulation of the adjusted points.

Krishnamurthy say nothing about identifying borders of features much less using them to constrain points in making a displaced surface mesh. In fact the word "border" is not even mentioned in Krishnamurthy.

It is submitted that the invention of independent claim 18 distinguishes over Krishnamurthy and withdrawal of the rejection is requested.

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It is submitted that claim 24 continues to be allowable. It is further submitted that the claims are not taught, disclosed or suggested by the prior art. The claims are therefore in a condition suitable for allowance. An early Notice of Allowance is requested.

If any further fees, other than and except for the issue fee, are necessary with respect to this paper, the U.S.P.T.O. is requested to obtain the same from deposit account number 19-3935.

Respectfully submitted,

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